

#4

SEQUENCE LISTING

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<120> SCREENING METHOD INVOLVING MGDG SYNTHASE

<130> 213993US0PCT

<140> 09/926,169

<141> 2000-03-17

<150> FR 99 03434

<151> 1999-03-19

<160> 11

<170> PatentIn version 3.1

<210> 1

<211> 23

<212> DNA

<213> Spinacia oleracea

<400> 1

ctcatttgaa gggcagtagc acc

<210> 2
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<212> DNA
<213> Spinacia oleracea

<400> 2
cacacaatat ttccaatgta tacccac

27

<210> 3
<211> 25
<212> DNA
<213> Spinacia oleracea

<400> 3
gattatcatt tcccctcgcc ctgcc

25

<210> 4
<211> 26
<212> DNA
<213> Spinacia oleracea

<400> 4
ggagcatatg ggggtgagtg ataatg

26

<210> 5
<211> 28
<212> DNA
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<400> 5
gttctggatc ctcaagcagc acaagagt 28

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<211> 28

<212> DNA

<213> Spinacia oleracea

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ctccacatat gcttaattcc ggggagag 28

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<400> 7
gttctggatc ctcaagcagc accgagta 28

<210> 8

<211> 522

<212> PRT

<213> Spinacia oleracea

<400> 8

Met Ser His Pro Ser Thr Val Thr Ser Glu Pro Ser Asn Leu Leu Asp
1 5 10 15

Phe Val Pro Lys Leu Gly Asn Phe Val Leu Asn Ser Ser Leu His Gly
20 25 30

Asn Asn Ser Asn Gly Tyr Ser Ser Phe Ser Ser Asn Ser Val His Phe
35 40 45

Gly Gly Leu Ala Thr Gln Asn Arg Tyr Lys Phe Val Asn Ser Leu Ser
50 55 60

Phe Ser Lys Glu Gly Ser Asn Leu Lys Arg Ile Leu Ser Asp Phe Asn
65 70 75 80

Arg Val Ile Arg Leu His Cys Asp Arg Ile Pro Leu Gly Phe Ser Ser
85 90 95

Ile Gly Leu Asn Ser Gly Glu Ser Asn Gly Val Ser Asp Asn Gly His
100 105 110

Gly Val Leu Glu Asp Val Arg Val Pro Val Asn Ala Val Glu Pro Glu
115 120 125

Ser Pro Lys Arg Val Leu Ile Leu Met Ser Asp Thr Gly Gly Gly His
130 135 140

Arg Ala Ser Ala Glu Ala Ile Lys Ala Ala Phe Asn Glu Glu Phe Gly
145 150 155 160

Asp Asp Tyr Gln Val Phe Val Thr Asp Leu Trp Ser Glu His Thr Pro
165 170 175

Trp Pro Phe Asn Gln Leu Pro Arg Ser Tyr Asn Phe Leu Val Lys His
180 185 190

Gly Pro Leu Trp Lys Met Met Tyr Tyr Gly Thr Ser Pro Arg Val Ile
195 200 205

His Gln Ser Asn Phe Ala Ala Thr Ser Val Phe Ile Ala Arg Glu Val
210 215 220

Ala Arg Gly Leu Met Lys Tyr Gln Pro Asp Ile Ile Ile Ser Val His
225 230 235 240

Pro Leu Met Gln His Val Pro Leu Arg Ile Leu Arg Gly Arg Gly Leu
 245 250 255

Leu Glu Lys Ile Val Phe Thr Thr Val Val Thr Asp Leu Ser Thr Cys
 260 265 270

His Pro Thr Trp Phe His Lys Leu Val Thr Arg Cys Tyr Cys Pro Ser
 275 280 285

Asn Glu Val Ala Lys Arg Ala Thr Lys Ala Gly Leu Gln Pro Ser Gln
 290 295 300

Ile Lys Val Tyr Gly Leu Pro Val Arg Pro Ser Phe Val Arg Ser Val
 305 310 315 320

Arg Pro Lys Asn Glu Leu Arg Lys Glu Leu Gly Met Asp Glu His Leu
 325 330 335

Pro Ala Val Leu Leu Met Gly Gly Gly Glu Gly Met Gly Pro Ile Glu
 340 345 350

Ala Thr Ala Arg Ala Leu Gly Asn Ala Leu Tyr Asp Ala Asn Leu Gly
 355 360 365

Glu Pro Thr Gly Gln Leu Leu Val Ile Cys Gly Arg Asn Lys Lys Leu
 370 375 380

Ala Gly Lys Leu Ser Ser Ile Asp Trp Lys Ile Pro Val Gln Val Lys
 385 390 395 400

Gly Phe Val Thr Lys Ile Glu Glu Cys Met Gly Ala Cys Asp Cys Ile
 405 410 415

Ile Thr Lys Ala Gly Pro Gly Thr Ile Ala Glu Ala Met Ile Arg Gly
 420 425 430

Leu Pro Ile Ile Leu Asn Asp Tyr Ile Ala Gly Gln Glu Ala Gly Asn
 435 440 445

Val Pro Tyr Val Ile Glu Asn Gly Ile Gly Lys Tyr Leu Lys Ser Pro
450 455 460

Lys Glu Ile Ala Lys Thr Val Ser Gln Trp Phe Gly Pro Lys Ala Asn
465 470 475 480

Glu Leu Gln Ile Met Ser Gln Asn Ala Leu Lys His Ala Arg Pro Asp
485 490 495

Ala Val Phe Lys Ile Val His Asp Leu Asp Glu Leu Val Arg Gln Lys
500 505 510

Ile Phe Val Arg Gln Tyr Ser Cys Ala Ala
515 520

<210> 9

<211> 525

<212> PRT

<213> Cucumis sativa

<400> 9

Met Arg Asn Pro Ser Thr Val Val Gln Glu Asn Gly Ser Val Ser Asp
1 5 10 15

Phe Ile Ser Gln Leu Gly Tyr Phe Ala Phe Ser Ser Arg Phe Leu Asn
20 25 30

Leu Asn Ser Glu Gly Cys Ser Gly Ser Ser Ser His Ser Leu Tyr Leu
35 40 45

Asn Gly Phe Glu Asn Tyr Arg Cys Val Lys Arg Pro Pro Arg Ser Gly
50 55 60

Ala Ser Leu Ser Leu Ser Ser Arg Gly Ser Ser Ser Leu Arg Arg Phe
65 70 75 80

Val Asn Glu Phe Asn Asn Val Ile Lys Phe His Cys His Lys Pro Pro
85 90 95

Leu Gly Phe Ala Ser Leu Gly Gly Val Ser Asp Glu Thr Asn Gly Ile
100 105 110

Arg Asp Asp Gly Phe Gly Val Ser Gln Asp Gly Ala Leu Pro Leu Asn
115 120 125

Lys Ile Glu Ala Glu Asn Pro Lys Arg Val Leu Ile Leu Met Ser Asp
130 135 140

Thr Gly Gly Gly His Arg Ala Ser Ala Glu Ala Ile Lys Ala Ala Phe
145 150 155 160

Asp Glu Glu Phe Gly Asn Asn Tyr Gln Val Phe Ile Thr Asp Leu Trp
165 170 175

Thr Asp His Thr Pro Trp Pro Phe Asn Gln Leu Pro Arg Ser Tyr Asn
180 185 190

Phe Leu Val Lys His Gly Thr Leu Trp Lys Met Thr Tyr Tyr Val Thr
195 200 205

Ala Pro Lys Val Ile His Gln Ser Asn Phe Ala Ala Thr Ser Thr Phe
210 215 220

Ile Ala Arg Glu Val Ala Lys Gly Leu Met Lys Tyr Arg Pro Asp Ile
225 230 235 240

Ile Ile Ser Val His Pro Leu Met Gln His Val Pro Ile Arg Ile Leu
245 250 255

Arg Ser Lys Gly Leu Leu Asn Lys Ile Val Phe Thr Thr Val Val Thr
260 265 270

Asp Leu Ser Thr Cys His Pro Thr Trp Phe His Lys Leu Val Thr Arg
275 280 285

Cys Tyr Cys Pro Ser Thr Glu Val Ala Lys Arg Ala Leu Thr Ala Gly
290 295 300

Leu Gln Pro Ser Lys Leu Lys Val Phe Gly Leu Pro Val Arg Pro Ser
305 310 315 320

Phe Val Lys Pro Ile Arg Pro Lys Ile Glu Leu Arg Lys Glu Leu Gly
325 330 335

Met Asp Glu Asn Leu Pro Ala Val Leu Leu Met Gly Gly Gly Glu Gly
340 345 350

Met Gly Pro Ile Glu Ala Thr Ala Lys Ala Leu Ser Lys Ala Leu Tyr
355 360 365

Asp Glu Asn His Gly Glu Pro Ile Gly Gln Val Leu Val Ile Cys Gly
370 375 380

His Asn Lys Lys Leu Ala Gly Arg Leu Arg Ser Ile Asp Trp Lys Val
385 390 395 400

Pro Val Gln Val Lys Gly Phe Val Thr Lys Met Glu Glu Cys Met Gly
405 410 415

Ala Cys Asp Cys Ile Ile Thr Lys Ala Gly Pro Gly Thr Ile Ala Glu
420 425 430

Ala Met Ile Arg Gly Leu Pro Ile Ile Leu Asn Asp Tyr Ile Ala Gly
435 440 445

Gln Glu Ala Gly Asn Val Pro Tyr Val Val Glu Asn Gly Cys Gly Lys
450 455 460

Phe Ser Lys Ser Pro Lys Glu Ile Ala Asn Ile Val Ala Lys Trp Phe
465 470 475 480

Gly Pro Lys Ala Asp Glu Leu Leu Ile Met Ser Gln Asn Ala Leu Arg
485 490 495

Leu Ala Arg Pro Asp Ala Val Phe Lys Ile Val His Asp Leu His Glu
500 505 510

Leu Val Lys Gln Arg Ser Phe Val Pro Gln Tyr Ser Gly
515 520 525

<210> 10

<211> 533

<212> PRT

<213> Arabidopsis thaliana

<400> 10

Met Gln Asn Pro Ser Thr Val Thr Gln Glu Ser Ala Ala Pro Val Phe
1 5 10 15

Asp Phe Phe Pro Arg Leu Arg Gly Leu Thr Ser Arg Asn Arg Ser Pro
20 25 30

Cys Ser Asn Ser Asp Gly Tyr Ala Leu Ser Ser Ser Asn Ala Leu Tyr
35 40 45

Phe Asn Gly Phe Arg Thr Leu Pro Ser Arg Arg Met Gly Lys Thr Leu
50 55 60

Ala Ser Leu Ser Phe Asn Thr Lys Ser Ser Ala Gly Ser Ser Leu Arg
65 70 75 80

Arg Phe Ile Ser Asp Phe Asn Ser Phe Ile Arg Phe His Cys Asp Lys
85 90 95

Val Val Pro Glu Ser Phe Ala Ser Val Gly Gly Val Gly Leu Ser Ser
100 105 110

Asp Glu Asn Gly Ile Arg Glu Asn Gly Thr Gly Gly Val Leu Gly Glu
115 120 125

Glu Gly Leu Pro Leu Asn Gly Val Glu Ala Asp Arg Pro Lys Lys Val
130 135 140

Leu Ile Leu Met Ser Asp Thr Gly Gly Gly His Arg Ala Ser Ala Glu
145 150 155 160

Ala Ile Arg Ala Ala Phe Asn Gln Glu Phe Gly Asp Glu Tyr Gln Val
165 170 175

Phe Ile Thr Asp Leu Trp Thr Asp His Thr Pro Trp Pro Phe Asn Gln
180 185 190

Leu Pro Arg Ser Tyr Asn Phe Leu Val Lys His Gly Thr Leu Trp Lys
195 200 205

Met Thr Tyr Tyr Gly Thr Ser Pro Arg Ile Val His Gln Ser Asn Phe
210 215 220

Ala Ala Thr Ser Thr Phe Ile Ala Arg Glu Ile Ala Gln Gly Leu Met
225 230 235 240

Lys Tyr Gln Pro Asp Ile Ile Ile Ser Val His Pro Leu Met Gln His
245 250 255

Val Pro Leu Arg Val Leu Arg Ser Lys Gly Leu Leu Lys Lys Ile Val
260 265 270

Phe Thr Thr Val Ile Thr Asp Leu Ser Thr Cys His Pro Thr Trp Phe
275 280 285

His Lys Leu Val Thr Arg Cys Tyr Cys Pro Ser Thr Glu Val Ala Lys
290 295 300

Arg Ala Gln Lys Ala Gly Leu Glu Thr Ser Gln Ile Lys Val Tyr Gly
305 310 315 320

Leu Pro Val Arg Pro Ser Phe Val Lys Pro Val Arg Pro Lys Val Glu
325 330 335

Leu Arg Arg Glu Leu Gly Met Asp Glu Asn Leu Pro Ala Val Leu Leu
340 345 350

Met Gly Gly Gly Glu Gly Met Gly Pro Ile Glu Ala Thr Ala Arg Ala
355 360 365

Leu Ala Asp Ala Leu Tyr Asp Lys Asn Leu Gly Glu Ala Val Gly Gln
370 375 380

Val Leu Ile Ile Cys Gly Arg Asn Lys Lys Leu Gln Ser Lys Leu Ser
385 390 395 400

Ser Leu Asp Trp Lys Ile Pro Val Gln Val Lys Gly Phe Ile Thr Lys
405 410 415

Met Glu Glu Cys Met Gly Ala Cys Asp Cys Ile Ile Thr Lys Ala Gly
420 425 430

Pro Gly Thr Ile Ala Glu Ala Met Ile Arg Gly Leu Pro Ile Ile Leu
435 440 445

Asn Gly Tyr Ile Ala Gly Gln Glu Ala Gly Asn Val Pro Tyr Val Val
450 455 460

Glu Asn Gly Cys Gly Lys Phe Ser Lys Ser Pro Lys Glu Ile Ser Lys
465 470 475 480

Ile Val Ala Asp Trp Phe Gly Pro Ala Ser Lys Glu Leu Glu Ile Met
485 490 495

Ser Gln Asn Ala Leu Arg Leu Ala Lys Pro Glu Ala Val Phe Lys Ile
500 505 510

Val His Asp Met His Glu Leu Val Arg Lys Lys Asn Ser Leu Pro Gln
515 520 525

Leu Ser Cys Thr Ala
530

<210> 11

<211> 468

<212> PRT

<213> Arabidopsis thaliana

<400> 11

Met Ala Thr Thr Val Met Ala Leu Ala Glu Lys Val Leu Glu Arg Val
1 5 10 15

Tyr Gly Thr Ser Lys Ser Ala Val Ser Val Thr Ser Gly Asp Gly Glu
20 25 30

Lys Thr His Arg His Thr His His His Ile His Arg Ile Lys Ser Tyr
35 40 45

Asp Asp Ile Asp Glu Asp Glu Ser Ser Leu Glu Leu Ile Gln Ile Gly
50 55 60

Ala Glu Arg Thr Lys Asn Val Leu Ile Leu Met Ser Asp Thr Gly Gly
65 70 75 80

Gly His Arg Ala Ser Ala Glu Ala Ile Arg Asp Ala Phe Lys Ile Glu
85 90 95

Phe Gly Asp Lys Tyr Arg Val Ile Val Lys Asp Val Trp Lys Glu Tyr
100 105 110

Thr Gly Trp Pro Leu Asn Asp Met Glu Arg Ser Tyr Lys Phe Met Val
115 120 125

Lys His Val Gln Leu Trp Lys Val Ala Phe His Ser Thr Ser Pro Lys
130 135 140

Trp Ile His Ser Cys Tyr Leu Ala Ala Ile Ala Ala Tyr Tyr Ala Lys
145 150 155 160

Glu Val Glu Ala Gly Leu Met Glu Tyr Lys Pro Glu Ile Ile Ile Ser
165 170 175

Val His Pro Leu Met Gln His Ile Pro Leu Trp Val Leu Lys Trp Gln
180 185 190

Glu Leu Gln Lys Arg Val Leu Phe Val Thr Val Ile Thr Asp Leu Asn
195 200 205

Thr Cys His Pro Thr Trp Phe His Pro Gly Val Asn Arg Cys Tyr Cys
210 215 220

Pro Ser Gln Glu Val Ala Lys Arg Ala Leu Phe Asp Gly Leu Asp Glu
225 230 235 240

Ser Gln Val Arg Val Phe Gly Leu Pro Val Arg Pro Ser Phe Ala Arg
245 250 255

Ala Val Leu Val Lys Asp Asp Leu Arg Lys Glu Leu Glu Met Asp Gln
260 265 270

Asp Leu Arg Ala Val Leu Leu Met Gly Gly Gly Glu Gly Met Gly Pro
275 280 285

Val Lys Glu Thr Ala Lys Ala Leu Glu Glu Phe Leu Tyr Asp Lys Glu
290 295 300

Asn Arg Lys Pro Ile Gly Gln Met Val Val Ile Cys Gly Arg Asn Lys
305 310 315 320

Lys Leu Ala Ser Ala Leu Glu Ala Ile Asp Trp Lys Ile Pro Val Lys
325 330 335

Val Arg Gly Phe Glu Thr Gln Met Glu Lys Trp Met Gly Ala Cys Asp
340 345 350

Cys Ile Ile Thr Lys Ala Gly Pro Gly Thr Ile Ala Glu Ser Leu Ile
355 360 365

Arg Ser Leu Pro Ile Ile Leu Asn Asp Tyr Ile Pro Gly Gln Glu Lys
370 375 380

Gly Asn Val Pro Tyr Val Val Glu Asn Gly Ala Gly Val Phe Thr Arg
385 390 395 400

Ser Pro Lys Glu Thr Ala Arg Ile Val Gly Glu Trp Phe Ser Thr Lys
405 410 415

Thr Asp Glu Leu Glu Gln Thr Ser Asp Asn Ala Arg Lys Leu Ala Gln
420 425 430

Pro Glu Ala Val Phe Asp Ile Val Lys Asp Ile Asp Glu Leu Ser Glu
435 440 445

Gln Arg Gly Pro Leu Ala Ser Val Ser Tyr Asn Leu Thr Ser Ser Phe
450 455 460

Ala Ser Leu Val
465